

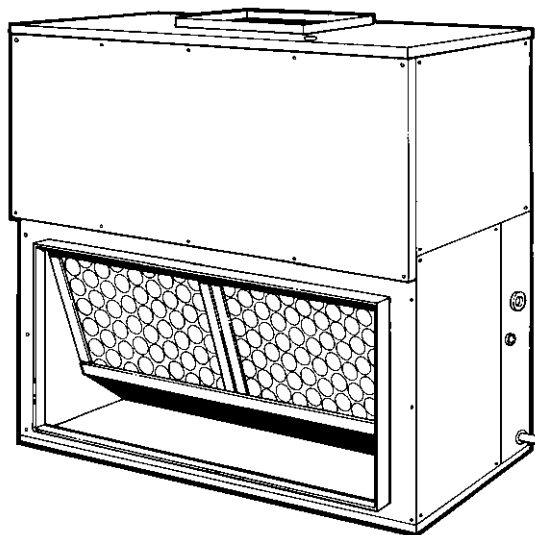
# INSTALLATION MANUAL

## SPLIT-SYSTEM HEAT PUMPS INDOOR UNITS

Supersedes: 515.41-N2Y (692)/035-09651-000

035-09651-001-A-0304

### MODELS F3EH090 & F4EH120 (50 and 60 Hz)



#### GENERAL

These completely assembled indoor units include a well-insulated cabinet, a copper tube/aluminum fin coil, throw-away filters, a centrifugal blower, a blower motor, an adjustable V-belt drive, a blower motor contactor and a small holding charge of an inert gas. They also include a filter-drier, an expansion valve and a distributor that are only used during the cooling cycle plus a check valve to provide the proper flow of refrigerant through the coil during both the cooling and heating cycles.

Supplemental resistance heaters, a supply air plenum, a return air grille and a base are available as accessories for field installation.

The units are shipped in the vertical position ready for field installation. For horizontal installation, reverse the solid bottom panel and the return air duct flange on the front of the unit.

#### REFERENCE

This instruction covers the installation of the indoor unit. For information on the installation and operation of the matching outdoor unit, refer to Form 035-15410-002.

Renewal Parts:

- Refer to Parts Manual for complete listing of replacement parts on this equipment.

All forms referenced in this instruction may be ordered from:

**Standard Register**  
**Toll Free Tel.: 877-318-9675**  
**Toll Free Fax: 877-379-7920**

Installer should pay particular attention to the words: NOTE, CAUTION and WARNING. Notes are intended to clarify or make the installation easier. Cautions are given to prevent equipment damage. Warnings are given to alert the installer that personal injury and/or equipment damage may result if the installation procedure is not handled properly.

#### INSPECTION

As soon as a unit is received, it should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's freight bill. A sepa-

#### CAUTION

THIS PRODUCT MUST BE INSTALLED IN STRICT COMPLIANCE WITH THE ENCLOSED INSTALLATION INSTRUCTIONS AND ANY APPLICABLE LOCAL, STATE, AND NATIONAL CODES INCLUDING, BUT NOT LIMITED TO, BUILDING, ELECTRICAL, AND MECHANICAL CODES.

#### WARNING

IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTENANCE CAN CAUSE INJURY OR PROPERTY DAMAGE. REFER TO THIS MANUAL. FOR ASSISTANCE OR ADDITIONAL INFORMATION, CONSULT A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER.

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Refer to the matching outdoor unit installation instruction (Form 035-15410-002) for the operating sequence of the entire system.

## MAINTENANCE

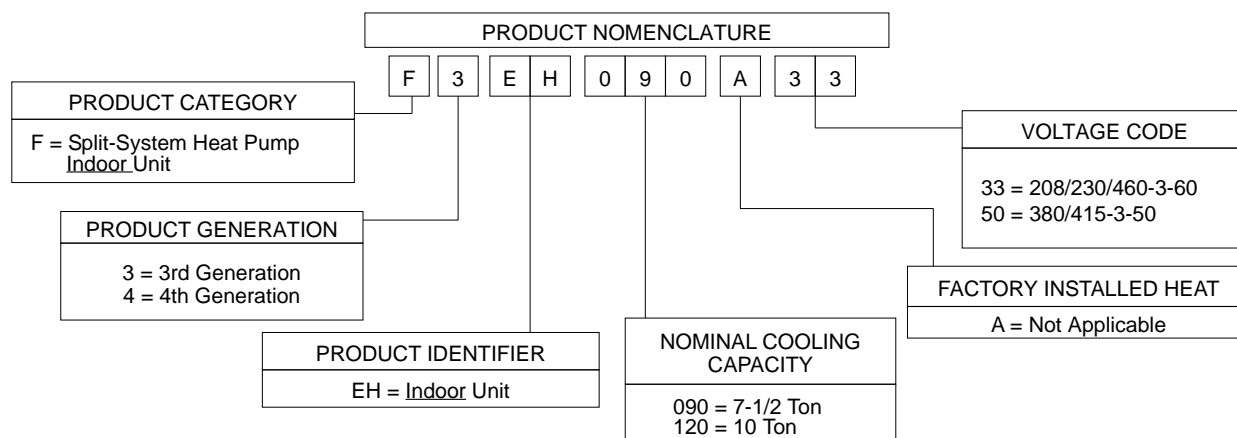
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## INSTALLATION

rate request for inspection by the carrier's agent should be made in writing.

### LIMITATIONS

These units must be installed in accordance with all national and local safety codes. If no local codes apply, installation must conform with the appropriate national codes. Units are designed to meet National Safety Code Standards. If components are to be added to a unit to meet local codes, they are to be installed at the dealer's and/or the customer's expense. See Table 2 for application limitations.

### LOCATION

These indoor units are not designed for outdoor installation. They must be located within the building structure, either inside or outside the conditioned space.

The units should be located as close to the outdoor units as practical and positioned to minimize bends in the refrigerant piping.

Units being installed vertically or horizontally can be set directly on a floor or platform, or they can be supported by metal or wooden beams.

Units being installed horizontally can be suspended from above. Four 3/8" weld nuts are provided in the unit frame to accommodate hanger rods. Knockouts must be removed from the unit panels to expose these weld nuts. Refer to Figure 1 for their location and the individual load on each hanger rod.

**WARNING:** Be careful when attaching the hanger rods. Use a washer with a back-up nut on each rod and tighten down against the cabinet so they will not be allowed to turn or slip.

### RIGGING AND HANDLING

Exercise care when moving the unit. Do not remove any packaging until the unit is near the place of installation.

The packaging consists of a bottom wooden skid that can be lifted with a fork truck from any direction, a cardboard container that covers the entire unit, and strapping that secures the cardboard container to the bottom skid.

These units can be rigged with slings under the bottom skid.

**CAUTION:** Spreader bars should be used to prevent the slings from crushing the unit panels and frame.

Before rigging any unit, determine its weight from Table 1. Before rigging a unit for horizontal installation, determine its center of gravity from Figure 1, and make sure that its weight will be distributed equally.

### CLEARANCES

All units require certain minimum clearances for proper operation and service. Refer to Figure 12 for these clearances.

**TABLE 1 - PHYSICAL DATA**

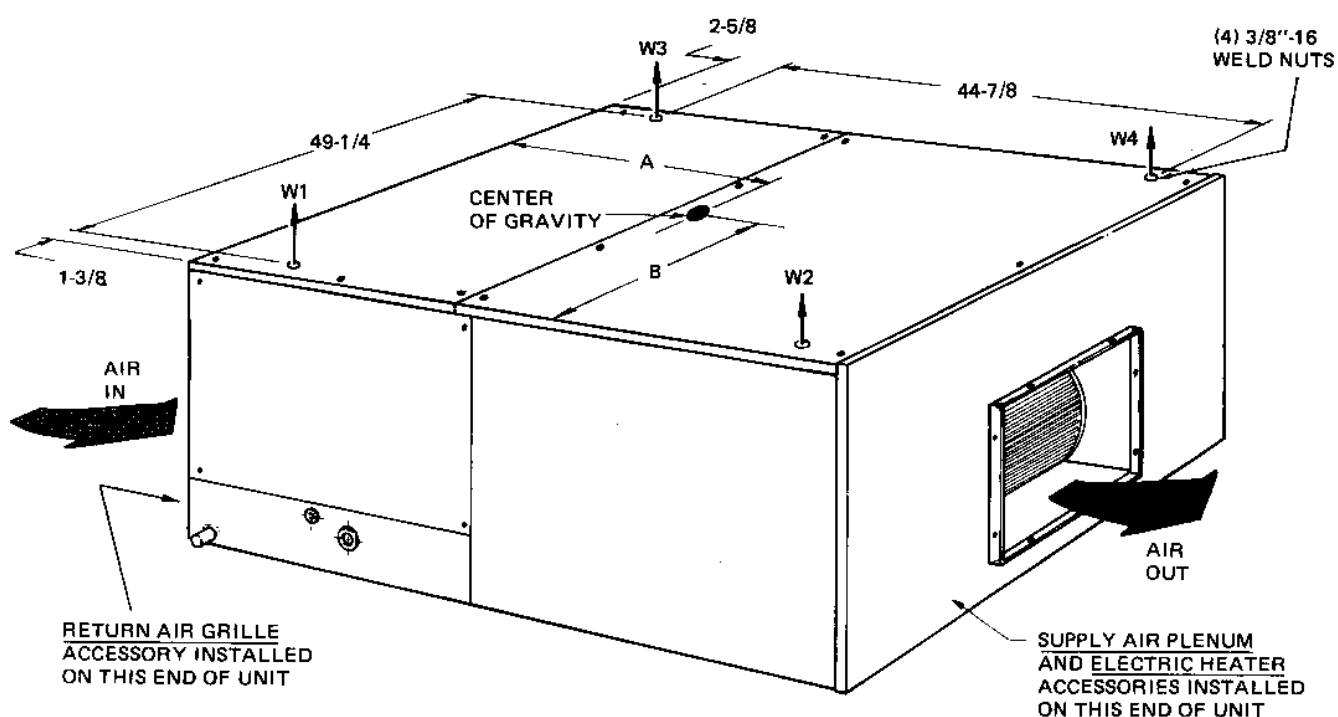
DESCRIPTION		UNIT MODEL	
		F3EH090	F4EH120
Coil	Rows Deep x Rows High	3 x 24	4 x 32
	Finned Length - inches	45.5	45.5
	Face Area - square feet	7.6	10.1
	Tube (Copper) OD - inches	3/8	3/8
	Fins (Aluminum) per inch	13	13
Centrifugal Blower (Forward Curve)	Diameter x Width - inches	15 X 15	15 X 15
Blower Motor <sup>1</sup>	Nominal Rating - HP	1-1/2	2
Filters (Throwaway)	Quantity Per Unit - 16" x 25" x 1"	4	4
	Total Face Area - square feet	11.1	11.1
Refrigerant-22 (Lbs.) <sup>2</sup>	Pumpdown Capacity	12.0	22.0
Unit Weight (lbs.)	Shipping	405	440
	Operating	365	400
Accessory Operating Weights (Lbs.)	Electric Heaters	10 KW	63
		16 KW	66
		26 KW	71
		36 KW	74
	Supply Air Plenum		102
	Base		60
	Return Air Grille		15

<sup>1</sup>All of these 1750 RPM motors have a solid base, a 56 frame, a 1.15 service factor, inherent protection & permanently lubricated ball bearings. Refer to page 6 for additional motor & drive data.

<sup>2</sup>Refer to Form 035-15410-002 for system charge.

**TABLE 2 - APPLICATION DATA**

Model	Power Supply	Voltage Variation <sup>1</sup>		Supply Air CFM		Entering Air Temperatures, °F			
		Min.	Max.	Min.	Max.	Cooling - wb		Heating - db	
						Min.	Max.	Min.	Max.
F3EH090	208/230-3-60	187	252	2400	3600	57	72	50 <sup>2</sup>	80
	460-3-60	414	506						
	380/415-3-50	342	456						
F4EH120	208/230-3-60	187	252	3200	4800	57	72	50 <sup>2</sup>	80
	460-3-60	414	506						
	380/415-3-50	342	456						

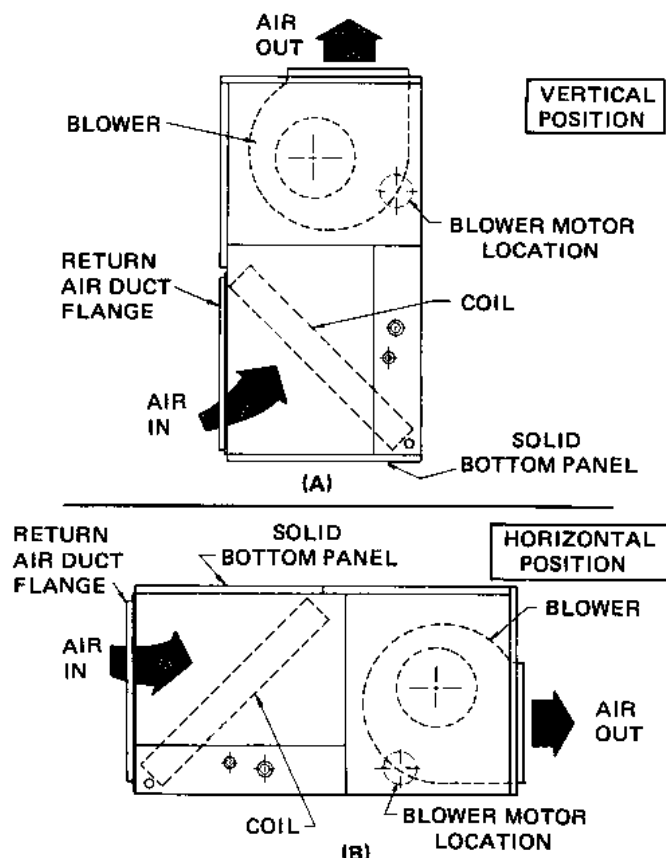
<sup>1</sup>Utilization Range "A" in accordance with ARI Standard 110.<sup>2</sup>The system may operate below 50°F for a short period of time when warming up the conditioned space after a long shutdown.**FIG. 1 - UNIT SUSPENSION MOUNTING (Horizontal Application)**

Model	Accessory	Based on a Standard Blower Motor						
		Center of Gravity Dimensions, In.		Weight Distribution, Lbs.				Total
		A	B	W1	W2	W3	W4	
F3EH090	Basic Unit Only	25-5/8	23-1/4	99	104	79	83	365
	Unit with Electric Heat	30-3/4	23-3/8	90	150	72	121	433
	Unit with Plenum	35-1/8	23-1/2	71	186	58	152	467
	Unit with Electric Heat & Plenum	38	23-5/8	62	232	51	190	535
F4EH120	Basic Unit Only	24-1/8	23-1/4	116	106	93	85	400
	Unit with Electric Heat	29-1/4	23-3/8	103	155	84	126	468
	Unit with Plenum	33-3/8	23-1/2	88	190	70	154	502
	Unit with Electric Heat & Plenum	36-5/8	23-5/8	76	236	63	195	570

NOTE: Unit weights (with electric heat accessory) are based on an average heater weight of 68 lbs.

**WARNING:** Do not permit overhanging structures or shrubs to obstruct air discharge.

Additional height may be required for snow clearance if winter operation is expected.



**FIG. 2 - VERTICAL AND HORIZONTAL APPLICATIONS**

### VERTICAL / HORIZONTAL INSTALLATION

These indoor units are shipped for vertical installation with vertical air discharge as shown in Figure 2(A) but may be converted for horizontal installation as shown in Figure 2(B) by interchanging the solid bottom panel and the return air duct flange.

### DUCT CONNECTIONS

Design and install all ducts in accordance with all national and/or local codes.

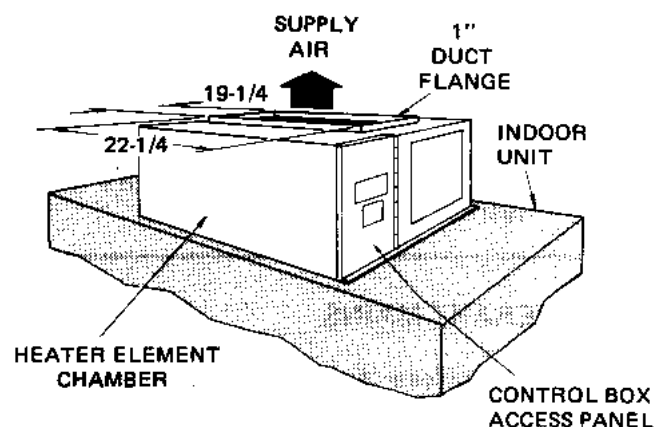
Ducts should be sized no smaller than the duct flanges on the unit or the electric heater (if used). Refer to the unit dimensions (Fig. 12) and the heater detail (Fig. 3) for these sizes. Refer to Form 035-16602-002 for installation instructions on the electric heater.

Use flexible fiber glass or plastic cloth collars or other nonflammable material at the unit duct connections to minimize the transmission of noise and vibration.

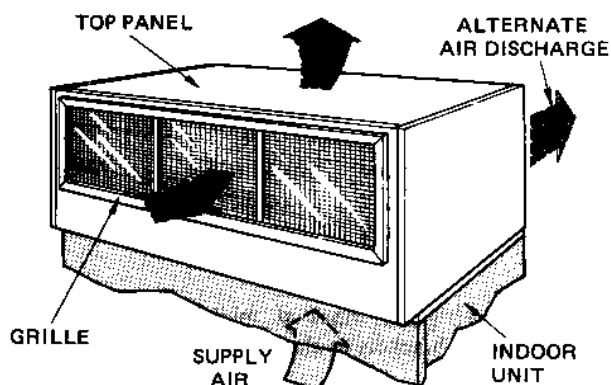
Insulate all ductwork running through unconditioned areas to prevent moisture condensation and to provide more economical operation.

The return air duct flange is factory-mounted on the front of the unit, but it can be reversed with the solid bottom panel for horizontal applications.

A supply air plenum (Fig. 4), a base (Fig. 5) and a return air grille (Fig. 6) are available as field-installed accessories, and one of the following respective instructions will be packed with each.

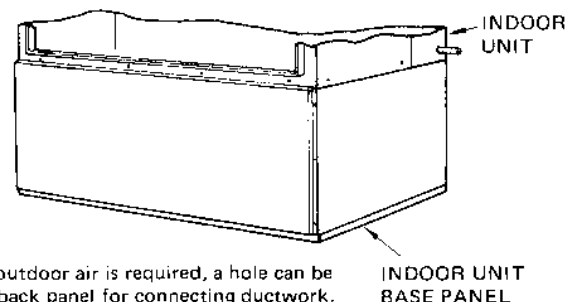


**FIG. 3 - ELECTRIC HEATER ACCESSORY**  
(Vertical Arrangement Shown)



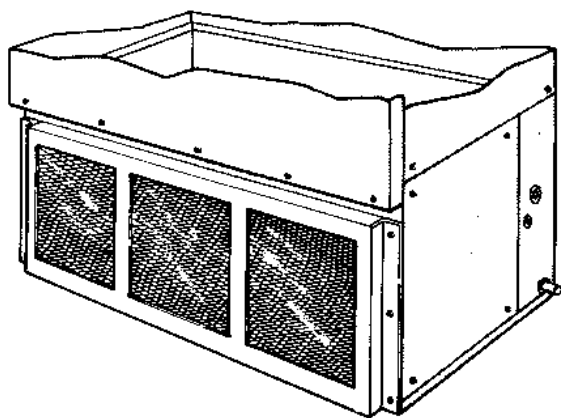
Plenum should be field mounted on the supply air end of indoor units for either vertical or horizontal application. For rear discharge, rotate plenum 180°. For horizontal discharge on a horizontal unit, the grille panel and the top panel will be arranged differently. Refer to Form 035-16650-001 for installation and assembly instructions.

**FIG. 4 - SUPPLY AIR PLENUM ACCESSORY**  
(Vertical Arrangement Shown)



When outdoor air is required, a hole can be cut in back panel for connecting ductwork.

**FIG. 5 - BASE ACCESSORY**  
(For Vertical Arrangement Shown)



**FIG. 6 - RETURN AIR GRILLE ACCESSORY**  
(Vertical Arrangement Shown)

Form 035-16650-001 – Supply Air Plenum  
Form 035-16621-001 – Return Air Grille  
Form 035-16632-001 – Base

The supply air plenum and the return air grille should be used in lieu of ductwork only when a free blow/free return application is practical.

## REFRIGERANT MAINS

Many service problems can be avoided by taking adequate precautions to provide an internally clean and dry system and by using procedures and materials that conform with established standards.

Use hard drawn copper tubing where no appreciable amount of bending around pipes or other obstructions is necessary. Use long radius ells wherever possible with one exception - small radius ells for any traps in a vapor riser. If soft copper is used, care should be taken to avoid sharp bends which may cause a restriction.

Fiber glass insulation and a sealing material such as perma-gum should be packed around refrigerant lines where they penetrate a wall to reduce vibration and to retain some flexibility.

Support all refrigerant lines at minimum intervals with suitable hangers, brackets or clamps.

Braze all copper to copper joints with Sil-Fos 5 or equivalent brazing material. DO NOT USE SOFT SOLDER.

Never braze or solder the liquid and vapor lines together. The complete vapor line should be insulated with minimum 1/2" AR-MAFLEX or equivalent.

If it is desirable to tape or wire these lines together for support purposes, they must be completely insulated, one from the other.

Refer to the installation instruction (Form 035-15410-002) for the matching outdoor unit for piping limitations, line sizes, and other design considerations.

## INSTALLING REFRIGERANT MAINS

**WARNING:** Provisions for recovering refrigerant releases must be available during all phases of installation, leak testing and charging. Do NOT release refrigerant into the atmosphere.

The units are evacuated and dehydrated at the factory and shipped with a holding charge of an inert gas such as Nitrogen or Helium. The vapor and liquid connections are sealed with copper discs.

If the unit has already lost its holding charge, it should be leak tested and the necessary repairs should be made. If the unit has maintained its holding charge, you can assume that it has no leaks and proceed with the installation.

The temperature required to make or break a brazed joint is sufficiently high to cause oxidation of the copper unless an inert atmosphere is provided.

Drill a small hole through the discs to prevent any internal pressure from blowing them off and to allow the flow of dry nitrogen through the connections when unbrazing the closures.

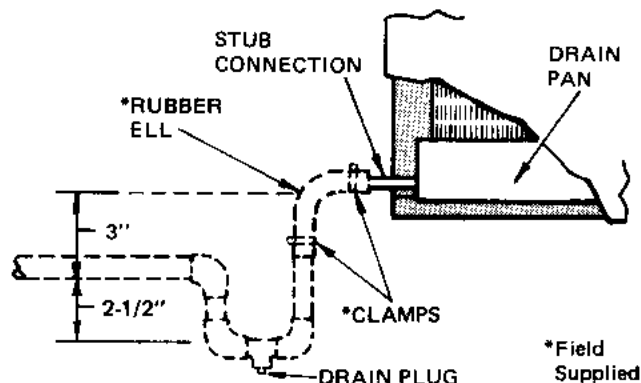
The liquid and vapor connections must be piped outside the unit. Refer to the unit drawing for the locations and the dimensions of these connections.

Before brazing the refrigerant lines to these connections, remove the short panel from the unit frame and slide the grommets onto the refrigerant lines. After the brazed joints have cooled, slide the grommets back into place and secure the panel to the unit frame.

**NOTE:** These coils can only be piped from one side of the unit.

## DRAIN CONNECTION

The drain line MUST be trapped because the coil is located on the negative side of the supply air blower, and it must be protected from freezing temperatures.



**FIG. 7 - RECOMMENDED DRAIN PIPING**

A 7/8" OD drain connection extends through right hand side of cabinet. Refer to Fig. 7 for recommended drain piping.

The drain connection is located on the same side of the unit as the refrigerant connections. The line should be insulated where moisture drippage will be objectionable or cause damage to the area.

The 3" dimension must equal or exceed the negative static pressure developed by the supply air blower. If it does not, the condensate will not drain properly and may overflow the drain pan. The trap must be at least 2-1/2" deep to maintain a water seal under all operating conditions, especially during blower start-up.

**NOTE:** The unit may have to be raised off the floor to allow enough height for the trap.

**TABLE 3 - SUPPLY AIR BLOWER MOTOR PULLEY ADJUSTMENT**

TURNS OPEN*	MODEL			
	F3EH090 60 Hz	F3EH090 50 Hz	F4EH120 60 Hz	F4EH120 50 Hz
5	655 RPM	542 RPM	700RPM	581 RPM
4	760	580	750	622
3	745	618	800	663
2	790	656	850	704
1	835	694	900	745
0	880	732	950	786

\*Pulleys can be adjusted in half-turn increments.

### SUPPLY AIR BLOWER ADJUSTMENT

The RPM of the supply air blower will depend on the required CFM, the unit accessories and the static resistances of both the supply and the return air duct systems. With this information, the RPM for the supply air blower can be determined from the blower performance in Table 4.

Knowing the required blower RPM and the blower motor HP, the setting (turns open) for the supply air motor pulley can be determined from Table 3.

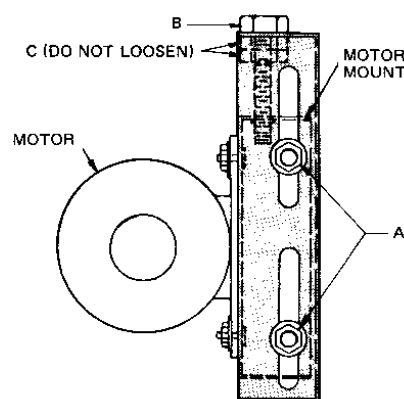
Each motor pulley has:

1. A threaded barrel with two flats (or notched recesses) 180 degrees apart.
2. A movable flange with one set screw.

After the movable flange has been rotated to the proper number of "turns open", the set screw should be tightened against the flat on the barrel to lock the movable flange in place. If the pulley includes a locking collar, the locking collar must be loosened to adjust the setting of the movable flange.

Note the following:

1. The supply air CFM must be within the limitations shown in Table 2.
2. All pulleys can be adjusted in half turn increments.
3. The tension on the belt should be adjusted for a deflection of 3/16 of an inch per foot of belt span with an applied force of 2 to 3 pounds. This adjustment is made by moving the blower motor mounting plate. Refer to Figure 8. Turning the adjustment bolt (B) moves the motor mounting plate up or down.



**FIG. 8 - TYPICAL MOTOR MOUNTING ASSEMBLY**

**NOTE:** Never loosen the two nuts (C).

Two hex nuts (A) have to be loosened to move the mounting plate and retightened after the mounting plate has been moved to the proper position.

4. All pulleys are factory aligned.
5. All supply air motor pulleys are factory set 3 "turns open".

After the supply air blower motor is operating, adjust the resistances in both the supply and the return duct systems to balance the air distribution throughout the conditioned space. The job specifications may require that this balancing be done by someone other than the equipment installer.

To check the supply air CFM after the initial balancing has been completed:

1. Drill two 5/16 inch holes in the side panel as shown in Figure 9.
2. Insert at least 6" of 1/4 inch tubing into each of these holes for sufficient penetration into the air flow on both sides of the indoor coil.

**NOTE:** The tubes must be inserted and held in a position perpendicular to the air flow so that velocity pressure will not affect the static pressure readings.

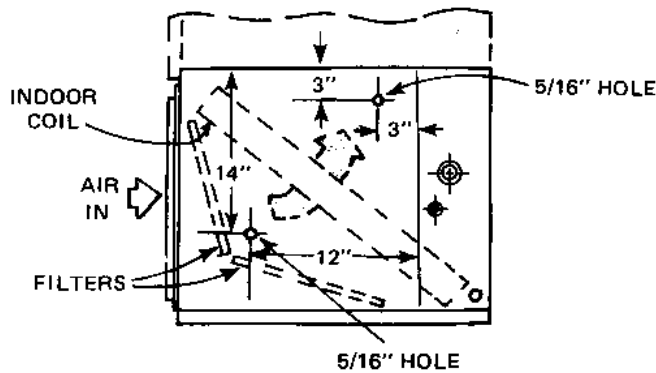
3. Using an inclined manometer, determine the pressure drop across a dry indoor coil. Since moisture on the coil may vary greatly, measuring the pressure drop across a wet coil under field conditions would be inaccurate. To assure a dry coil, the heat pump system should be de-activated while the test is being run.
4. Knowing the pressure drop across a dry coil, the actual CFM through the unit can be determined from the curve in Figure 10.

If the CFM is above or below the specified value, the supply air motor pulley may have to be readjusted. After one hour of operation, check the belt and pulleys for tightness and alignment.

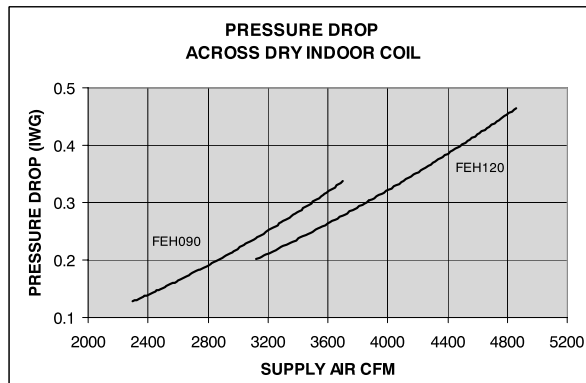
**WARNING:** Failure to properly adjust the total system CFM can result in extensive blower damage.

After readings have been obtained, remove the tubes and seal up the drilled holes in the side panel. Dot plugs (5/16" - P/N 029-13880-000) are available through normal parts ordering procedures.

**NOTE:** Shut down the heat pump system before taking any test measurements to assure a dry indoor coil.



**FIG. 9 - HOLE LOCATIONS FOR PRESSURE DROP READINGS**



**FIG. 10 - PRESSURE DROP ACROSS A DRY INDOOR COIL VS. SUPPLY AIR CFM**

**TABLE 4 - SUPPLY AIR BLOWER PERFORMANCE<sup>1,3</sup> (60 Hz Units)**

RPM	CFM																	
	ESP <sup>2</sup>	BHP	KW	ESP <sup>2</sup>	BHP	KW	ESP <sup>2</sup>	BHP	KW	ESP <sup>2</sup>	BHP	KW	ESP <sup>2</sup>	BHP	KW	ESP <sup>2</sup>	BHP	KW
<b>F3EH090 (60 Hz)</b>																		
	2400			2700			3000			3300			3600					
600	0.30	0.62	0.79	0.21	0.70	0.76	0.09	0.78	0.89	-	-	-	-	-	-	-	-	-
655	0.43	0.70	0.86	0.39	0.78	0.83	0.26	0.87	0.97	0.11	0.96	1.07	-	-	-	-	-	-
700	0.52	0.77	0.93	0.48	0.85	0.90	0.40	0.95	1.06	0.28	1.06	1.16	0.14	1.17	1.26	-	-	-
800	0.82	0.97	1.10	0.81	1.06	1.07	0.74	1.18	1.27	0.63	1.30	1.38	0.51	1.42	1.49	-	-	-
880	1.10	1.11	1.24	1.09	1.24	1.21	1.02	1.37	1.45	0.91	1.50	1.55	0.78	1.64	1.70	-	-	-
900	1.15	1.15	1.27	1.14	1.28	1.24	1.07	1.42	1.49	0.97	1.55	1.60	0.87	1.70	1.74	-	-	-
1000	1.49	1.35	1.46	1.47	1.48	1.43	1.42	1.63	1.65	1.35	1.81	1.82	1.27	2.02	2.02	-	-	-
<b>F4EH120 (60 Hz)</b>																		
	3200			3600			4000			4400			4800					
700	0.30	1.01	1.17	0.15	1.17	1.27	-	-	-	-	-	-	-	-	-	-	-	-
800	0.66	1.25	1.38	0.52	1.42	1.51	0.31	1.60	1.64	0.08	1.80	1.78	-	-	-	-	-	-
900	0.99	1.48	1.60	0.87	1.70	1.77	0.69	1.92	1.93	0.47	2.18	2.09	0.19	2.45	2.23	-	-	-
950	1.20	1.61	1.71	1.08	1.86	1.90	0.90	2.12	2.07	0.72	2.39	2.23	0.41	2.67	2.42	-	-	-
1000	1.37	1.75	1.83	1.27	2.02	2.02	1.11	2.30	2.20	0.92	2.60	2.39	0.63	2.90	2.59	-	-	-

**TABLE 5 - SUPPLY AIR BLOWER PERFORMANCE<sup>1,3</sup> (50 Hz Units)**

RPM	CFM																	
	ESP <sup>2</sup>	BHP	KW	ESP <sup>2</sup>	BHP	KW	ESP <sup>2</sup>	BHP	KW	ESP <sup>2</sup>	BHP	KW	ESP <sup>2</sup>	BHP	KW	ESP <sup>2</sup>	BHP	KW
<b>F3EH090 (50 Hz)</b>																		
	2000			2250			2500			2750			3000					
500	0.22	0.43	0.41	0.16	0.48	0.46	0.08	0.53	0.50	-	-	-	-	-	-	-	-	-
542	0.30	0.47	0.45	0.25	0.53	0.50	0.18	0.58	0.55	0.10	0.63	0.60	-	-	-	-	-	-
550	0.32	0.48	0.46	0.27	0.54	0.51	0.20	0.59	0.56	0.12	0.64	0.61	0.01	0.70	0.66	-	-	-
600	0.42	0.54	0.51	0.38	0.60	0.57	0.32	0.66	0.62	0.23	0.72	0.68	0.13	0.78	0.73	-	-	-
650	0.54	0.60	0.57	0.50	0.66	0.62	0.45	0.73	0.68	0.37	0.79	0.74	0.28	0.85	0.80	-	-	-
700	0.67	0.67	0.63	0.63	0.73	0.69	0.58	0.80	0.75	0.52	0.87	0.82	0.43	0.95	0.89	-	-	-
732	0.77	0.71	0.67	0.73	0.77	0.72	0.68	0.84	0.79	0.62	0.93	0.87	0.54	1.02	0.96	-	-	-
750	0.83	0.74	0.69	0.79	0.80	0.75	0.73	0.87	0.82	0.68	0.97	0.91	0.60	1.07	1.00	-	-	-
<b>F4EH120 (50 Hz)</b>																		
	2800			3150			3500			3850			4200					
550	0.14	0.65	0.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
581	0.21	0.70	0.64	0.05	0.77	0.70	-	-	-	-	-	-	-	-	-	-	-	-
600	0.26	0.73	0.67	0.10	0.80	0.73	-	-	-	-	-	-	-	-	-	-	-	-
650	0.40	0.81	0.74	0.25	0.89	0.82	0.11	0.98	0.91	-	-	-	-	-	-	-	-	-
700	0.54	0.90	0.83	0.41	1.00	0.93	0.27	1.11	1.03	0.10	1.25	1.16	-	1.40	1.29	-	-	-
750	0.70	0.99	0.92	0.58	1.12	1.04	0.45	1.25	1.16	0.29	1.40	1.29	0.10	1.55	1.43	-	-	-
786	0.81	1.06	0.98	0.71	1.21	1.13	0.59	1.36	1.26	0.43	1.51	1.39	0.24	1.66	1.54	-	-	-
800	0.86	1.09	1.01	0.76	1.25	1.16	0.64	1.41	1.30	0.49	1.55	1.43	0.30	1.71	1.58	-	-	-

<sup>1</sup>Unit resistance is based on a wet indoor coil and clean filters.

<sup>2</sup>Available static pressure in IWG to overcome the resistance of the duct system and any accessories added to the unit. Refer to the Tables 6 & 7 for the resistance of these accessories and for additional motor and drive data.

<sup>3</sup>Motors can be selected to operate into the service factor because they are located in the moving air stream, upstream of any heating device.

RPM range for the standard drive components.

Exceeds the BHP limitations of the standard blower motor.



**TABLE 6 - ACCESSORY STATIC RESISTANCE (IWG)** (To be included with Duct System Static Resistance)

Model	Accessory		Static Resistance, IWG				
BLOWER CFM			2400	2700	3000	3300	3600
F3EH090	Electric Heat	10 KW	0.01	0.01	0.01	0.02	0.02
		16 KW	0.01	0.02	0.02	0.03	0.04
		26 KW	0.03	0.04	0.05	0.06	0.07
		36 KW	0.05	0.07	0.08	0.10	0.11
	Supply Air Plenum		0.03	0.03	0.04	0.05	0.06
	Return Air Grille		0.02	0.03	0.04	0.05	0.06
BLOWER CFM			3200	3600	4000	4400	4800
F4EH120	Electric Heat	10 KW	0.02	0.02	0.03	0.03	0.04
		16 KW	0.03	0.04	0.05	0.06	0.07
		26 KW	0.06	0.07	0.09	0.11	0.13
		36 KW	0.09	0.11	0.14	0.17	0.20
	Supply Air Plenum		0.05	0.06	0.07	0.08	0.10
	Return Air Grille		0.05	0.06	0.07	0.08	0.10

**TABLE 7 - BLOWER MOTOR AND DRIVE DATA**

Model		Motor HP*	Blower RPM	Adjustable Motor Pulley		Fixed Blower Pulley		Belt	
				Pitch Dia. (Inches)	Bore (Inches)	Pitch Dia. (Inches)	Bore (Inches)	Designation	Pitch Lg. (Inches)
60 Hz	F3EH090	1-1/2	655 - 880	2.8 - 3.8	7/8	7.5	1	A36	37.3
	F4EH120	2	700 - 950			7.0			
50 Hz	F3EH090	1-1/2	542 - 732			7.5			
	F4EH120	2	581 - 786			7.0			

\*These factory-mounted motors are wired for a 460V power supply. Refer to the wiring diagram inside the motor terminal box when reconnecting the motor leads for a 208 or 230 volt power supply.

**TABLE 8 - ELECTRICAL DATA**

Blower Motor HP	Power Supply	FLA	Max. Fuse Size, <sup>1</sup> AMPS	Max. Wire Length <sup>2</sup> (Ft.)
<b>F3EH090</b>				
1-1/2	208-3-60	5.3	10	207
	230-3-60	5.8	10	209
	460-3-60	2.7	5	897
	380-3-50	3.3	5	606
	415-3-50	4.0	5	546
<b>F4EH120</b>				
2	208-3-60	7.5	10	146
	230-3-60	6.8	10	178
	460-3-60	3.4	5	712
	380-3-50	4.0	5	500
	415-3-50	4.5	5	485

NOTE: Refer to Form 550.13-N10.1 for electrical data on units equipped with an electric heat accessory.

<sup>1</sup>Dual element, time delay fuses.

<sup>2</sup>Based on three 60°C, 14 AWG, insulated copper conductors in steel conduit, a 3% voltage drop.

**CONTROL WIRE SIZING**

Wire Size	Maximum Total Circuit Length (Feet)
#19 Solid	130
#18 Solid	170
#18 Stranded	180
#16 Stranded	270
#14 Stranded	455
#12 Stranded	730

To determine the total circuit length, add the following distances:

- 1 - Outdoor Unit to Indoor Unit \_\_\_\_\_
- 2 - Indoor Unit to Thermostat \_\_\_\_\_
- 3 - Thermostat to Indoor Unit \_\_\_\_\_
- 4 - Indoor Unit to Outdoor Unit \_\_\_\_\_
- 5 - Outdoor Unit to Elec. Heater \_\_\_\_\_

Total Circuit Length \_\_\_\_\_

## POWER AND CONTROL WIRING

Install electrical wiring in accordance with the latest National Electrical Code (NFPA Standard No. 70) and/or local regulations. The unit should be grounded in accordance with these codes.

Route the power wires into the unit through the 1-3/8" knockout in the rear panel, and connect them to the terminals on blower motor contactor 10M. Route the control wires into the unit through the 7/8" hole in the rear panel, and connect them to the terminals on block 4TB. Refer to the unit drawing in Fig. 12 for the locations of these knockouts.

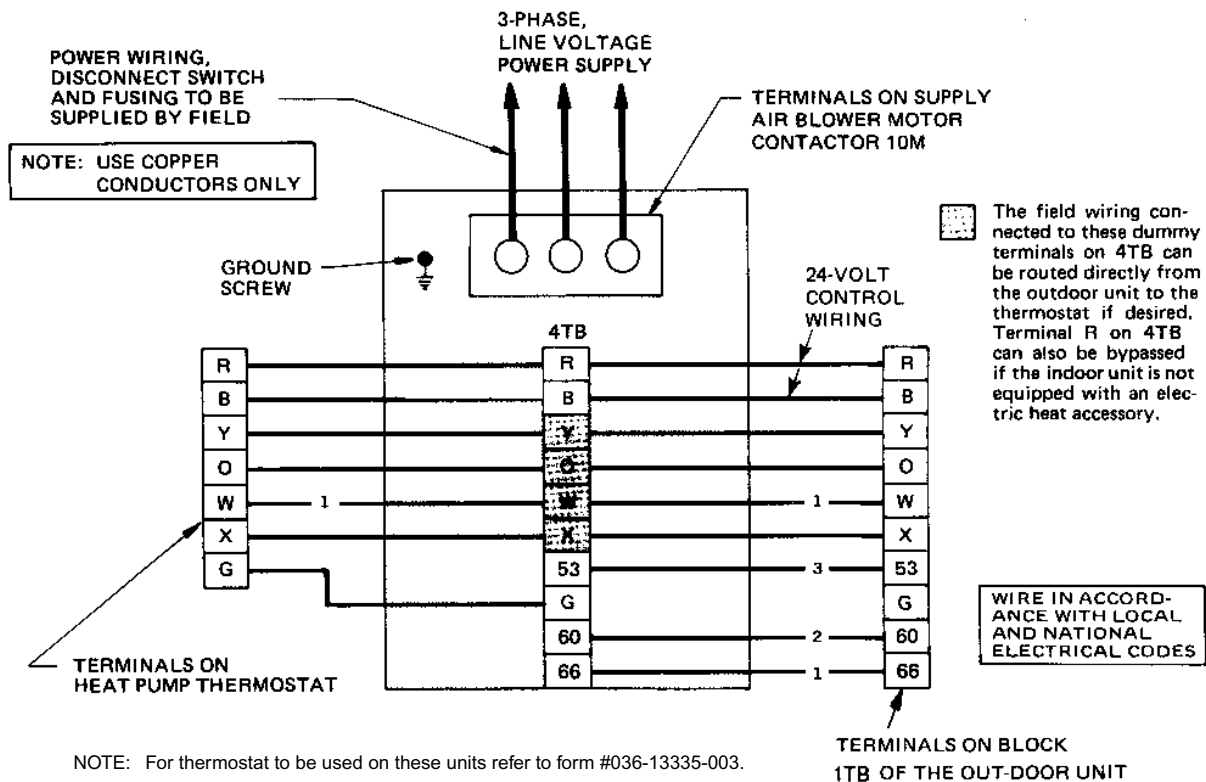
If the unit includes an electric heat accessory, route the power wires into heater control box in lieu of the unit. Refer to electric

heat instruction Form 035-16602-002 for additional installation information.

**NOTE:** Motors are wired for a 460V power supply. Refer to the wiring diagram inside the motor terminal box when re-connecting motor leads for a 208 or 230 volt power supply.

Refer to Table 6 to size the disconnect switch, the power wiring, the fuses and the control wiring. Refer to Fig. 11 for field wiring diagram.

*If the supply air blower rotates in the wrong direction, reverse two of the motor leads at blower motor contactor 10M.*



<sup>1</sup>Only required when an electric heat accessory is used.

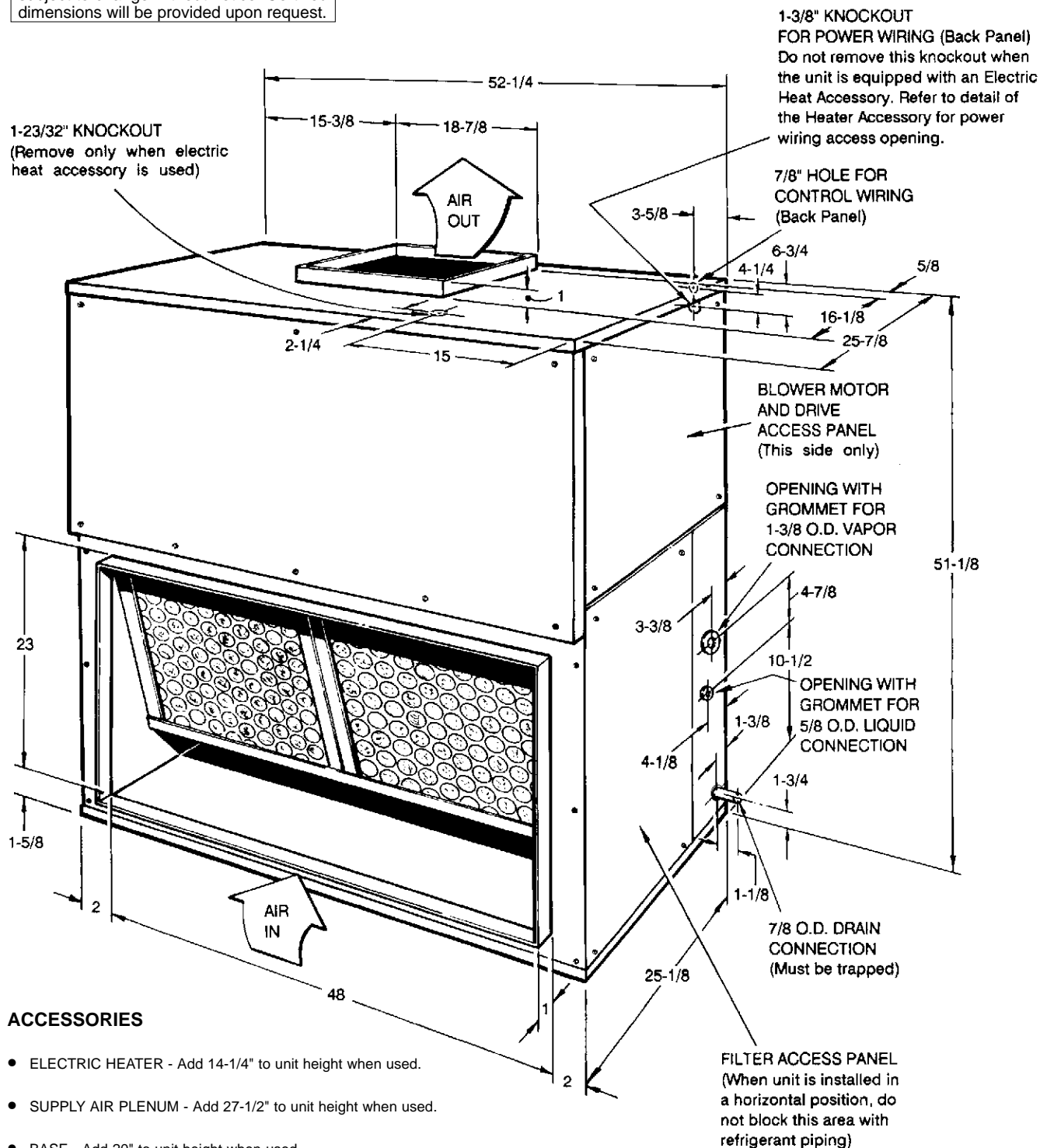
<sup>2</sup>Only required when a 16 or 26KW electric heat accessory is used.

<sup>3</sup>Only required when a 36KW electric heat accessory is used.

**NOTE:** Refer to electric heat instruction 035-16602-002 for additional power and control wire requirements if the indoor unit is equipped with an electric heat accessory.

**FIG. 11 - FIELD WIRING**

All dimensions are in inches. They are subject to change without notice. Certified dimensions will be provided upon request.



### CLEARANCES

Side with RETURN AIR opening	24"
Side with SUPPLY AIR opening	24" <sup>1</sup>
Side with PIPING CONNECTIONS	52" <sup>2</sup>
Side opposite PIPING CONNECTIONS	12"
Side with access for both POWER & CONTROL WIRING	3
Bottom	4

<sup>1</sup>Overall dimension of the unit will vary if an electric heater, a supply air plenum or a base is used.

<sup>2</sup>This dimension is required for removal of the coil. Only 26" is required for normal servicing.

<sup>3</sup>Although no clearance is required for service and operation, some clearance may be required for routing the power wiring and the control wiring.

<sup>4</sup>Allow enough clearance to trap the condensate drain line.

**SECURE OWNER'S APPROVAL:** *When the system is functioning properly, secure the owner's approval. Show him the location of all disconnect switches and the thermostat. Teach him how to start and stop the unit, how to adjust temperature settings within the limitations of the system, how the defrost cycle is controlled and how the anti-cycle timer operates.*

## MAINTENANCE

### INDOOR COIL

Do not allow dirt to accumulate on the indoor coil or other parts of the supply/return air circuit. Clean as often as necessary to assure good system performance. Use a brush, vacuum cleaner attachment or other suitable means.

If the coil becomes extremely dirty, it may be necessary to use an industrial grade detergent and a hose to clean the finned surfaces. This is recommended to prevent any loss in capacity and efficiency.

### DRAIN PAN

The condensate drain pan should be inspected regularly to assure proper drainage.

### FILTERS

The filters must be replaced as often as necessary to assure good air flow and filtering action. Clean filters will prevent any loss in capacity and efficiency.

Refer to the unit drawing in Fig. 12 for the location of the filter access panel.

### LUBRICATION

The bearings for the blower shaft and the blower motor are permanently lubricated and should not require any additional lubricant.

### BELTS

Maintain belt tension to extend belt life. Replace when signs of failure begin to appear.